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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Pere Roca I Cabarrocas

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7590

03/30/2009

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EXAMINER

WHALEN, DANIEL B

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/544,787	Applicant(s) ROCA I CABARROCAS ET AL.	
	Examiner DANIEL WHALEN	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-10, 20 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-19 and 22-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 August 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/08/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claims 20, 21, and 1-10 are withdrawn. Applicant's election **without** traverse of claims 11-19 and 22-27 in the reply filed on 12/30/2008 is acknowledged.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if

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the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Content of Specification

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.
- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) The Names Of The Parties To A Joint Research Agreement: See 37 CFR 1.71(g).
- (e) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.
- (f) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:
 - (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
 - (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are

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solved by the applicant's invention. This item may also be titled "Background Art."

- (g) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.
- (h) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.
- (i) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (j) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (k) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if

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an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

- (l) Sequence Listing. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “2” has been used to designate both “active material” and “electrodes”. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 11-19 and 22-27 are objected to because of the following informalities:

For instance, In claim 11 line 3, reference character “2” has been used to designate

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both “active material” and “electrodes”. In line 2, add -- : -- between “steps of” and “forming”. In lines 5 and 6, remove “-”. Furthermore, Examiner suggests removing numerical number in the pending claims. Additional minor errors seen in pending claims and Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the pending claims.

Claims 11 and 26 are objected to because of the following informalities: For instance, in claim 11 line 4, “vapor deposition methods” should be read -- a vapor deposition method --. Appropriate correction is required.

Claim 22 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 11-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata (US 6,078,059; hereinafter “Nakata A”) in view of Shtein et al. (US 2003/0054586 A1; hereinafter “Shtein”).

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3. **Re Claim 11**, Nakata A teaches a method for producing a transistor for active matrix display comprising the steps of:

forming an active material (12) and electrodes (18a,18b), said active material being formed using vapor deposition methods (col. 8, lines 53-60, sputtering method) and said transistor (TFT) comprising an insulator (14, silicon nitride), and forming a microcrystalline film (15) on top of said insulator at a temperature comprised between 100 and 400°C (col. 9, lines 3-16). using at least a deposition chemical element (SiH_4) and a crystallization chemical element (H_2), wherein the said crystalline fraction being 70% (col. 7, lines 1-4).

However, although Nakata A discloses that the crystalline fraction being 70% (col. 7, lines 1-4), Nakata A does not explicitly disclose forming a plasma treated interface on top of said insulator; and wherein the said crystalline fraction being above 80%. Shtein discloses a method of producing the transistor (Abstract & fig. 6), comprising: forming a plasma treated interface on top of the insulator (silicon nitride) so as to reduce polar character of the resulting surface (paragraph 29 & 40). Furthermore, regarding the crystalline fraction, it has held that discovering an optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Nakata A with that of Shtein so as to reduce the polar character of the resulting surface and the crystalline fraction above 80% as it is routine skill in the art so as to optimize the microcrystalline film.

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It is noted that, regarding the grain size, the term "microcrystalline" structure in a semiconductor TFT generally refers to the crystal grains that have small size such as the size ranging between 10 nm and 400 nm. This argument is applied to the rejection of claim 22.

Re Claim 12, Shtein teaches wherein said plasma treated interface is selected from the group consisting of a SiN_x layer, a SiN_xO_y layer, a SiO_2 layer and glass (paragraph 29).

Re Claim 13, Shtein teaches wherein one forms the plasma treated interface using a gas selected from the group consisting of N_2 , O_2 , N_2O and NH_3 (paragraph 29).

4. **Claims 11, 15-19, and 22-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata et al. (US 5,796,116; hereinafter "Nakata B") in view of Nakata A.

5. **Re Claim 11**, Nakata teaches a method for producing a transistor for active matrix display comprising the steps of:

forming an active material (103) and electrodes (109), said active material being formed using vapor deposition methods (col. 8, lines 32-45, sputtering method) and said transistor (TFT) comprising an insulator (105), wherein, forming a plasma treated interface (col. 16, lines 20-39) on top of said insulator, and forming a microcrystalline film (106) on top of said treated interface at a temperature comprised between 100 and 400°C. using at least a deposition chemical element (SiH_4) and a crystallization

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chemical element (H_2), wherein the said crystalline fraction being 70% (col. 12, lines 31-40).

However, Nakata B does not explicitly disclose a temperature for forming the microcrystalline film and wherein the said crystalline fraction being above 80%. Nevertheless, one of ordinary skill in the art would recognize that the RF-PCVD process discussed in Nakata B for forming the microcrystalline structure generally requires a low temperature (e.g. 100 and 400°C) due to the plasma, which improves the reaction of gases at the low temperature as evidenced by Nakata A (col. 9, lines 3-16). Furthermore, regarding the crystalline fraction, it has held that discovering an optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Nakata B with that of Nakata A so as to adjust the temperature as a readily available method to obtain the microcrystalline structure at a low temperature and the crystalline fraction above 80% as it is routine skill in the art so as to optimize the microcrystalline film.

It is noted that, regarding the grain size, the term "microcrystalline" structure in a semiconductor TFT generally refers to the crystal grains that have small size such as the size ranging between 10 nm and 400 nm. This argument is applied to the rejection of claim 22.

Re Claim 15, Nakata B teaches wherein said crystallization chemical elements is H_2 (fig. 2).

Re Claim 16, Nakata B teaches wherein said deposition chemical elements are selected among the group comprising SiH_4 , SiF_4 (fig. 2).

Re Claim 17, although Nakata B does not explicitly disclose that said deposition chemical elements flux and said crystallization chemical elements flux are at equilibrium during the growth of the microcrystalline silicon film, one of ordinary skill in the art would readily adjust the parameter during CVD deposition process to obtain optimized microcrystalline film. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the deposition chemical elements flux and the crystallization chemical elements flux are at equilibrium during the growth of the microcrystalline silicon film so as to obtain optimized microcrystalline film.

Re Claim 18, Nakata B teaches wherein one forms a top gate transistor (fig. 12).

Re Claim 19, Nakata B teaches wherein one patterns the substrate comprising a metallic layer (1207) to form source and drain electrodes.

Re Claim 22, Nakata B teaches wherein the microcrystalline silicon film comprises grains whose size ranges between 10 nm and 400 nm (see rejection of claim 1).

Re Claim 23, Nakata B teaches wherein the microcrystalline silicon film (5) thickness is comprised between 100 nm and 450 nm. It has held that discovering an optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Furthermore, if the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not performed different than the prior art device, the claimed

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device is not patentable distinct from the prior art device: *In re Gardner v. TEC Systems, Inc.*, 220 USPQ 777.

Re Claim 24, although Nakata B does not explicitly disclose that the microcrystalline silicon film is produced by hot wire technique, it is conventionally known to one of ordinary skill in the art that the hot wire CVD method is a readily known CVD types that deposits amorphous or microcrystalline silicon in silicon based TFT. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the microcrystalline film is formed by a readily available HWCVD so as to form the predictable silicon layer in the TFT.

Re Claim 25, Nakata B teaches wherein the microcrystalline silicon film is produced by radiofrequency, glow discharge technique (RF-PCVD).

Re Claim 26, similar to argument in claim 24, although Nakata B does not explicitly disclose that the vapor deposition methods use radiofrequency glow discharge technique, it is conventionally known to one of ordinary skill in the art that the RF-PCVD method is a readily known CVD types in silicon based TFT. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the vapor deposition methods use radiofrequency glow discharge technique so as to form the predictable active material layer in the TFT.

Re Claim 27, Nakata B teaches wherein one uses a 13.56 MHz PECVD reactor. Applicant should note that frequency "13.56 MHz" is the standard radio frequency of in plasma CVD process.

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6. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata B as applied to claim 11 above, and further in view of Law et al. (US 2003/0189208 A1; hereinafter "Law").

Re Claim 14, teaching of Nakata B has been discussed above. However, Nakata B does not explicitly disclose using a buffer gas selected from the group consisting of Ar, Xe, Kr, and He. Law discloses a method of producing a transistor, comprising (Abstract): using the buffer gas selected from the group consisting of Ar, Xe, Kr, and He as a carrier/purging gas (paragraph 37,57). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Nakata B with that of Law so as to use the gas as the carrier/purging gas in the process chamber.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL WHALEN whose telephone number is (571)270-3418. The examiner can normally be reached on Monday-Friday, 7:30am to 5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. W./
Examiner, Art Unit 2829
03/25/2009

Daniel Whalen
/Michael S. Lebentritt/

Primary Examiner, Art Unit 2829